

Original Research Article

Study frequency of ABO and RH in patients with acute coronary syndrome referred to Ardabil city hospital

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Received: 21 December 2017

Revised: 03 February 2018

Accepted: 05 February 2018

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ABSTRACT

Background: Regarding the high prevalence, the increasing trend of acute coronary syndrome (ACS), the importance of etiological studies of diseases and the existence of some reports on the role of blood groups in the development of diseases, including IHD, in order to study the blood groups in patients with acute coronary syndrome and other factors, this research was conducted in Ardabil.

Methods: This is a descriptive study that was carried out from March 2016 to May 2017 in a Hospital of Ardabil on 500 patients selected randomly from patients admitted to cardiac care unit of Hospital. The criteria for entering the study were: All subjects over the age of 30 and both sexes were males and females who had myocardial infarction (MI), unstable angina (UA) based on history, examination, serial electrocardiography and measurement cardiac enzymes are given by a specialist physician and they are willing to participate in the study. Then, in the checklist for each patient, the blood type ABO and RH, the age, sex, and risk factors of the disease such as hypertension, diabetes, obesity, consumption smoking, high blood lipids, and family history of premature stenosis were extracted from the patient records and then analyzes by statistical methods in SPSS.19.

Results: Of all patients, 60.2% were male and the mean age was 62.28 years. Hypertension with 61.6%, smoking with 37.4%, and hyperlipidemia with 23.4% were the most common risk factors among patients. The blood groups A and A+ were the most common type of blood type, but due to the higher prevalence of A blood group in healthy individuals living in Ardabil, there was no significant relation between ACS and blood groups.

Conclusions: Results showed that blood groups did not show a meaningful relationship with the incidence of ACS and did not find any association between severity of this syndrome and blood groups.

Keywords: Acute coronary syndrome, Myocardial infarction, Blood groups, Ardabil

INTRODUCTION

ACS refers to a group of conditions resulting in a decrease in blood flow in the coronary arteries, so that a part of the heart muscle is not able to function correctly or is dead.¹ The most common symptom of this syndrome is chest pain and often accompanied by the release to the elbows and arms and be with nausea and sweating. ACS usually results from the following three outcomes: Acute

myocardial infarction with elevation (STEMI) (30%), infarction without ST segment elevation (NSTEMI) (25%) and unstable angina (38%).² ACS is a risk factor for health and causes 60% of death in the elderly. In unstable angina, usually a rupture of a plaque atherosclerotic causes a decrease in coronary arteries, but the artery is not completely blocked. Sometimes it's called angina before an infarction, because if an immediate intervention is not applied, the patient may have a MI. The MI in the part of the myocardium, is

permanently degraded which due to plaque rupture and consequently clot formation and complete arterial obstruction.³⁻⁷

Limited studies have been done about the possibility of relationship between the antigens of the ABO and RH with acute coronary events, especially acute MI and sudden cardiac death.⁸⁻¹⁰ The relationship between the ABO type and CAD pathogens may increase the prothrombotic state and the risk of cardiovascular risk, and should more levels of systemic inflammatory response in patients with different ABO.¹¹⁻¹³

In several studies, it has been reported that the O and B blood groups had a higher level of intestinal alkaline phosphatase, which is produced in the small intestine. These groups more produce this enzyme to use a higher protein level. But people with blood type A and AB have lower levels of this enzyme. Also, the low level of this enzyme in people with blood type A and AB lead to failing to break down food cholesterol levels and reducing the incidence of heart attacks, but the inverse results was seen in people with B and O blood types.¹⁴ Study relationship between blood groups and cholesterol levels in Japanese patients showed that cholesterol levels in patients with blood group B significantly higher than other blood groups. The frequency of B gene in patients with acquired heart disease is significantly increased. The occurrence of ischemic heart disease especially in deadly accidents, significantly increased in the blood group AB compared to other blood groups.¹⁵ The aim of this study was to investigate the frequency of ABO blood groups and RH in patients with ACS referred to Ardabil city hospital.

METHODS

This descriptive cross sectional study was performed on 500 patients admitted to Cardiac Care Center of Imam Khomeini Hospital in Ardabil from Mar 2016 to May 2017. All patients over the age of 30 and both sexes included in the study and all patients without address and call number and non-complete consent form excluded from the study. Myocardial infarction (MI), unstable angina (UA) based on history, examination, serial electrocardiography and measurement Cardiac enzymes was confirmed by a specialist physician. ABO and RH, age, sex and risk factors such as high blood pressure, diabetes, smoking, high blood lipids and family history of premature stenosis, were extracted from the patient records and entered in a checklist and then analyzed by descriptive and analytical statistical methods in SPSS.19. The $p < 0.05$ was set as significant.

RESULTS

In this study, 301 (60.2%) patients were male. The average age of patients was 62.3 ± 11.44 years and 150 (30%) patients were between in the age groups 50 – 60 years. 308 (61.6%) patients had a history of high blood

pressure, 107 (21.4%) patients had diabetes mellitus and 187 (37.4%) patients had smoking. The history of cardiovascular disease in one of the family members was seen in 183 patients (36.6%). The blood group A with 192 cases (38.4%) was the most common type of blood group and 451 patients (90.2%) had positive Rh. Results by RH type showed that the most prevalent group was A⁺ which was seen in 169 (88.02%) (Figure 1).

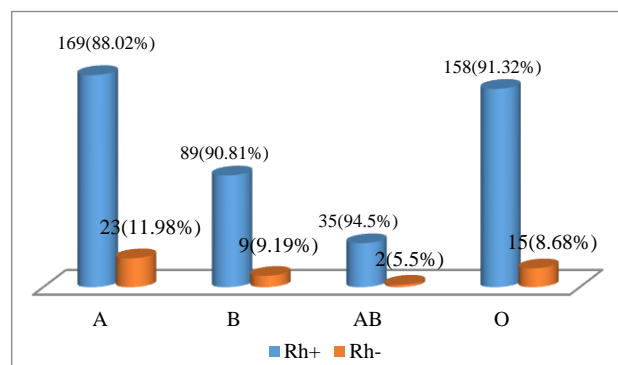


Figure 1: Frequency of patients with ACS by ABO and RH.

Study the type of ACS in patients showed that among the three groups, the most common type of this syndrome was unstable angina which was diagnosed in 396 patients (79.2%). 422 patients (84.4%) had positive angiographic findings (Figure 2).

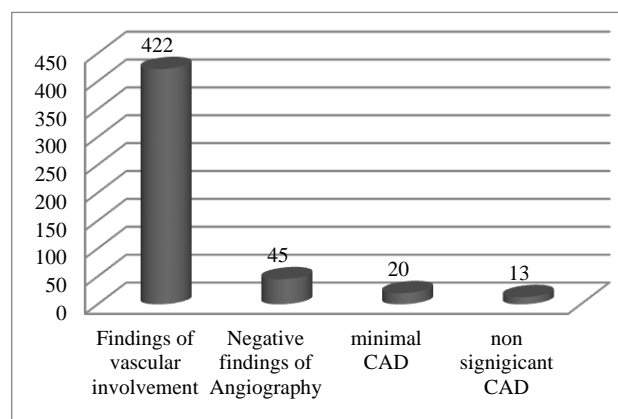


Figure 2: Frequency of ACS cases by angiography findings.

The results of this study showed that performing PCI with 216 (43.2%) was the most commonly used medical tool in these patients. 143 patients (33.9%) were involved in all major coronary arteries (Figure 3). LAD was the most commonly involved vessel in the coronary arteries with 353 cases (83.64%).

By comparing blood groups among patients with ACS with healthy people in the city with a marked blood type (control group), it was observed that there is no significant difference between the frequency of blood

groups in our study with the community and the incidence pattern of the blood group in our study is similar to healthy individuals in Ardabil (Table 1).

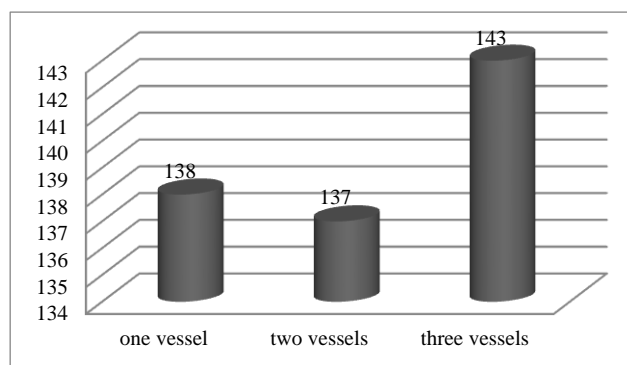


Figure 3: Frequency of ACS cases by number of involvement vessels.

There wasn't significant relationship between types of ACS and blood groups (Table 2).

There was no significant relationship between the Rh of blood groups and ACS occurrence (Table 3). There wasn't significant relationship between blood groups and angiographic findings.

Table 1: Rate of blood type in compare with other places

Blood group societies	A	B	AB	O
Iran	32.14	23.72	36.35	7.79
Tehran	32.44	23.48	35.9	8.18
Ardabil	36.7	19.7	35.9	8
Our study	38.4	19.6	34.6	7.4

Table 2: Relation between blood group and type of ACS.

Blood type	STEMI		NSTEMI		Unstable angina		P value
	n	%	n	%	n	%	
A+	29	17.2	5	3	135	79.9	0.096
A-	4	17.4	5	21.7	14	60.9	
B+	12	13.5	11	12.4	66	74.2	
B-	0	0	2	22.2	7	77.8	
AB+	2	5.7	3	8.6	30	85.7	
AB-	0	0	1	50	1	50	
O+	16	10.1	10	6.3	132	83.5	
O-	3	20	1	6.7	11	73.3	

Table 3: Relation between RH and type of ACS.

Blood type	STEMI		NSTEMI		Unstable angina		P value
	n	%	n	%	n	%	
Rh ⁺	59	13.1	32	7.1	360	13.1	0.403
Rh ⁻	7	14.3	9	12.2	36	14.3	

DISCUSSION

In this study, 60.2% of patients were male and the mean age of them was 62.3 years and in other studies, about 52% to 79% of patients were male and the average age between 53 and 65 years which was in line with our study results.¹⁶⁻²⁵

In above studies, it was found that the prevalence of disease in male was more than female. Also, the sixth and seventh decades of life are the most prevalent age of the disease occurrence, which was confirmed by the above studies. In our study, Hypertension with 61.6%, smoking with 37.4%, and hyperlipidemia with 23.4% were the most common risk factors among patients. In Hammoudeh et al study, there was at least one major risk factor such as hypertension, diabetes, cigarette and dyslipidemia in most coronary patients (95% in men vs. 96% in women).¹⁸ Also, in people with coronary heart disease, the prevalence of low HDL-C was 60% in men

and 39% in women. In Umesh et al study, smoking was the most common risk factor among men and smoking in addition diabetes were the most risk factor in women.²⁶ In the study of Deepak et al, the most common risk factors were high blood pressure (81.8%) and hypercholesterolemia (72.4%).²⁷

In this study the blood group A and A⁺ were the most common type of blood group, but due to the higher prevalence of blood group A in healthy individuals in Ardabil, there was no significant correlation between ACS and ABO. Also, there wasn't significant relationship between the findings of angiography and blood groups. In the study of Januszkiewicz et al, 348 (83.3%) patients had positive RH and the 7 years old mortality in patients with a positive RH was 22.7%. Also they showed that among the all blood groups only the positive RH could predicted the mortality in patients with ACS.²⁸ In the study of Mirie et al, in the general population of Tehran and Iran, the most common type of

blood group was O but in patients with IHD, the blood group A was more common. It seems that the blood type A had role in incidence of IHD.²⁹ In Banrej and et al study, the results showed that coronary heart disease has the highest rate in the blood group A.³⁰ In the Whincup et al study, the blood group A was associated with occurrence of IHD.³¹ In Boulton and et al study, IHD was significantly higher in patients with blood type A than the patients with blood group O. In Chen et al study, the blood group A had the higher risk in incidence of ACS (OR = 1.17; 1.04-1.33) and the blood group O had the lowest incidence rate (OR: 0.83; 0.74-0.92).⁵⁷ In another study by Biswas et al, stated that the blood group O had a high risk for ACS (OR: 2.26; 1.52-3.36), but the blood type AB had the lowest incidence rate and had a protective effect in the ACS (OR: 0.23; 0.13-0.40) and there was no significant association between the ACS and the blood groups A and B.³² In the study of Franchini et al, the blood group A was considered as a risk factor for the incidence of ACS (OR: 1.21; 1.08-1.35), but the O group was associated with a reduction in the incidence of this syndrome (OR: 0.86; 0.77-0.97) and there was no significant relationship between the syndrome and the blood groups AB and B.³³ In the studies by Gong et al and Lee et al, the blood group O had significant relation with the incidence of ACS (58.9).²⁵ However it was reported in Sari et al that there was no significant relationship between blood groups with sharp coronary syndrome and the frequency of blood groups was similar to that of healthy subjects. In the study of Amirzadegan et al, unlike the previous studies, the AB blood group was able to reduce the incidence of ACS (OR: 0.46; 0.22-0.95), but other blood groups not showed a significant correlation with incidence of ACS.^{34,35} In the study of Karabuva et al, 41.33% of patients had the blood group A, 35.29% the blood group O, 16.4% the blood group B and others the AB blood group.³⁶ In this study, there was no relationship between ACS and blood groups, and there was no significant relationship between the number of vessels involved, the severity of vascular involvement and the type of vessel involvement with the blood groups. In a study, Capuzzo et al stated that patients without blood group O had a significant relationship with the incidence of ACS and led to clinical and subclinical progression of the disease ($p=0.02$).³⁷ In above studies, it can be seen that the blood groups cannot lead to significant increase in the incidence of ACS of which, in a study A and in another study AB could lead to an increase in the ACS rate. According to the meta-analysis by Chen et al and recent studies we could say that the blood group A can somewhat increase the incidence of ACS and in the people with blood group O this syndrome was somewhat reduced but the results of this study could not confirm this finding and like many studies did not show any relationship between the blood group and the ACS occurrence.

CONCLUSION

The results of this study showed that blood groups did not show a significant relationship with the incidence of ACS

and did not find any association between severity of this syndrome and blood groups. Of course in other studies, different results were observed and in some study the blood group O and in some studies the blood group A showed this association but according to the conditions of this study, we could not see such a relationship.

ACKNOWLEDGEMENTS

Authors would like to thank all the participants who consented to participate in the study. Authors also thank those students of nursing sociology who helped in collecting data.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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Cite this article as: Zamani B, Amani F, Hadeei F. Study frequency of ABO and RH in patients with acute coronary syndrome referred to Ardabil city hospital. *Int J Sci Rep* 2018;4(5):109-13.